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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/779,285 | 02/08/2001 | William H. Gong | 37,248 | 6593 |

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BP Amoco Corporation
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| EXAMINER | |
|---|---|
| GRIFFIN, WALTER DEAN | |
| **ART UNIT** | **PAPER NUMBER** |
| 1764 | 9 |

DATE MAILED: 07/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/779,285 | Applicant(s) GONG ET AL. |
|---|---|---|
| | Examiner Walter D. Griffin | Art Unit 1764 |

-- *The MAILING DATE of this communication appears on th cov r sh et with the correspond nce address* --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *08 February 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Specification*

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

On page 26, lines 22 and 23, Applicant refers to applications by attorney docket number. The examiner requests that applicant supply the appropriate serial numbers that correspond to the docket numbers.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9 and 14-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 is indefinite because the expression "the high-boiling oxidation feedstock" lacks proper antecedent basis in claim 1.

Claim 14 is indefinite because it refers to a use of a sorbent but it is unclear how the sorbent is used. There are no steps recited.

Claims 15-18 are indefinite because claim 15 refers to the use of a liquid but it is unclear how the liquid is used. There are no steps recited.

Claims 19 and 20 are indefinite claims 19 and 20 refer to the use of a liquid but it is unclear how the liquid is used. There are no steps recited.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 2, 4, 9, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Rappas (6,402,940).

The Rappas reference discloses a process for removing sulfur from hydrocarbons such as diesel fuel, kerosene, and jet fuel. These hydrocarbons would necessarily boil within the claimed range and have API gravities within the claimed range. The process comprises treating a sulfur-containing hydrocarbon with an oxidizing solution containing hydrogen peroxide, an organic acid, and water at temperatures from about 50° to 130°C. The oxidation products are soluble in the oxidizing solution and are separated from the hydrocarbon by phase separation. The recovered hydrocarbon product has a reduced amount of sulfur as compared to the feed to the process. The reference also discloses the recycling of the aqueous oxidizing treating solution.

See col. 2, lines 58-67; col. 3, lines 1-40 and 63-67; col. 4, lines 1-7 and 24-55; col. 8, lines 46-49 and 57-67; col. 9, lines 1-17; and col. 10, lines 30-48.

Claims 1-3, 9, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Malisoff (1,972,102).

The Malisoff reference discloses a process for removing sulfur compounds from hydrocarbon oils by contacting the oil with a mixture of water, hydrogen peroxide, and organic acid such as acetic acid. Specific hydrocarbons disclosed include naphtha, gasoline, and gas oil. These hydrocarbons would necessarily have an API gravity and boil within the ranges claimed. Example 1 indicates a temperature of 90°F (32°C). After contacting, the mixture and oil separate into layers. The layers are then separated and the oil is recovered. See page 1, lines 6-32 and 49-68.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malisoff (1,972,102) in view of Rappas (6,402,940).

As discussed above, the Malisoff reference does not disclose recycling the recovered treating solution.

The Rappas reference discloses the recycling of an aqueous oxidizing treating solution. See col. 8, lines 46-49.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Malisoff by recycling the treating solution as suggested by Rappas because recycling will improve the economics of the process.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rappas (6,402,940) in view of Webster et al. (3,163,593).

As discussed above, the Rappas reference does not disclose the use of acetic acid.

The Webster reference discloses that either formic or acetic acid can be used along with hydrogen peroxide as an oxidizing agent in a hydrocarbon desulfurization. See col. 1, lines 15-22 and 70-72 and col. 2, lines 1-4.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Rappas by utilizing acetic acid instead of the

disclosed formic acid as suggested by Webster because Webster discloses that these two acids are equivalents in forming oxidizing solutions and the substitution of equivalents is within the level of ordinary skill in the art. One would expect the process of Rappas to be effective when using either the formic acid or acetic acid.

Claims 5-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rappas (6,402,940) in view of Hatanaka et al. (6,217,748).

The Rappas reference discloses a process for removing sulfur from hydrocarbons such as diesel fuel, kerosene, and jet fuel. These hydrocarbons would necessarily boil within the claimed range and have API gravities within the claimed range. The process comprises treating a sulfur-containing hydrocarbon with an oxidizing solution containing hydrogen peroxide, an organic acid, and water. The acid is present in a mole ratio of acid to peroxide of at least 11:1. The oxidation products are soluble in the oxidizing solution and are separated from the hydrocarbon by phase separation. The hydrocarbon is further treated by contacting it with an adsorbent such as alumina. It may also be further treated by contacting it with a caustic solution to neutralize any trace acid. Treatment by liquid-liquid extraction with a solvent such as methanol is also disclosed. The recovered hydrocarbon product has a reduced amount of sulfur as compared to the feed to the process. The reference also discloses the recycling of the aqueous oxidizing treating solution. See col. 2, lines 58-67; col. 3, lines 1-40 and 63-67; col. 4, lines 1-7 and 24-55; col. 8, lines 46-49 and 57-67; col. 9, lines 1-17; and col. 10, lines 30-48.

The Rappas reference does not disclose the preliminary hydrotreating step.

The Hatanaka reference discloses a process for removing sulfur from a hydrocarbon by hydrotreating the hydrocarbon feed and then separating the hydrotreated feed into a light and

heavy fraction. The hydrotreating catalyst contains Group VI (10-30 wt%) and VIII (1 to 10 wt%) metals. The light fraction scarcely contains sulfur and can be used without further desulfurization. The heavy fraction must be further desulfurized. The further desulfurized heavy fraction and the light fraction are mixed to form a desulfurized product. See col. 2, lines 65-67; col. 3, lines 1-11; col. 4, lines 11-48; col. 5, lines 3-7; and col. 6, lines 11-24.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Rappas by including a preliminary hydrotreating step as suggested by Hatanaka and further desulfurizing the heavy fraction of Hatanaka because only this portion of the hydrotreated feed would need to be further desulfurized by the oxidation treatment thereby reducing costs associated with the oxidation treatment. Also, substituting the oxidation treatment of Rappas for the second hydrotreatment of Hatanaka would have been obvious to one having ordinary skill in the art because these two treatments produce an equivalent result. Therefore, substituting one for the other would produce a process that would effectively desulfurize the hydrocarbon.

Claims 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rappas (6,402,940) in view of Hatanaka et al. (6,217,748) as applied to claim 11 above, and further in view of Webster et al. (3,163,593).

The previously discussed references do not disclose the use of acetic acid. They also do not disclose the claimed basic chemicals.

The Webster reference discloses that either formic or acetic acid can be used along with hydrogen peroxide as an oxidizing agent in a hydrocarbon desulfurization. See col. 1, lines 15-22 and 70-72 and col. 2, lines 1-4.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of the previously discussed references by utilizing acetic acid instead of the disclosed formic acid as suggested by Webster because Webster discloses that these two acids are equivalents in forming oxidizing solutions and the substitution of equivalents is within the level of ordinary skill in the art. Therefore, one would expect the process of Rappas to be effective when using either the formic acid or acetic acid.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of the previously discussed references by utilizing the claimed basic chemicals because one would realize that any basic chemical including those claimed would effectively neutralize the acid in the hydrocarbon.

## *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art not relied upon discloses desulfurization processes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

Walter D. Griffin
Primary Examiner
Art Unit 1764

WG
June 28, 2002